



Scientific studies can identify landslide-prone areas and evaluate their risk. Large landslide complexes near Lewiston were identified by geological mapping. The slides formed along steep cliffs composed of **basalt interbedded with sedimentary deposits**. (source: Idaho Geological Survey)



Rotational debris slide in May 1998 on the toe of the main landslide complex. Landslides occurred intermittently in the area between 1994-1998. Sliding began after the road was widened at the toe of the slide. The white-roofed building is the Elks Lodge. The slide blocked a major local road and threatened to destroy the building. Photo: IBHS.

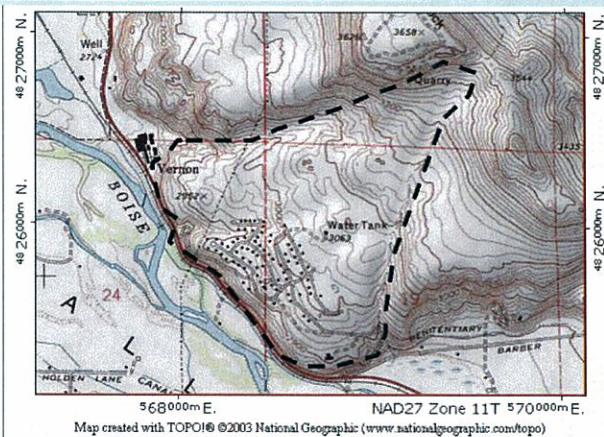
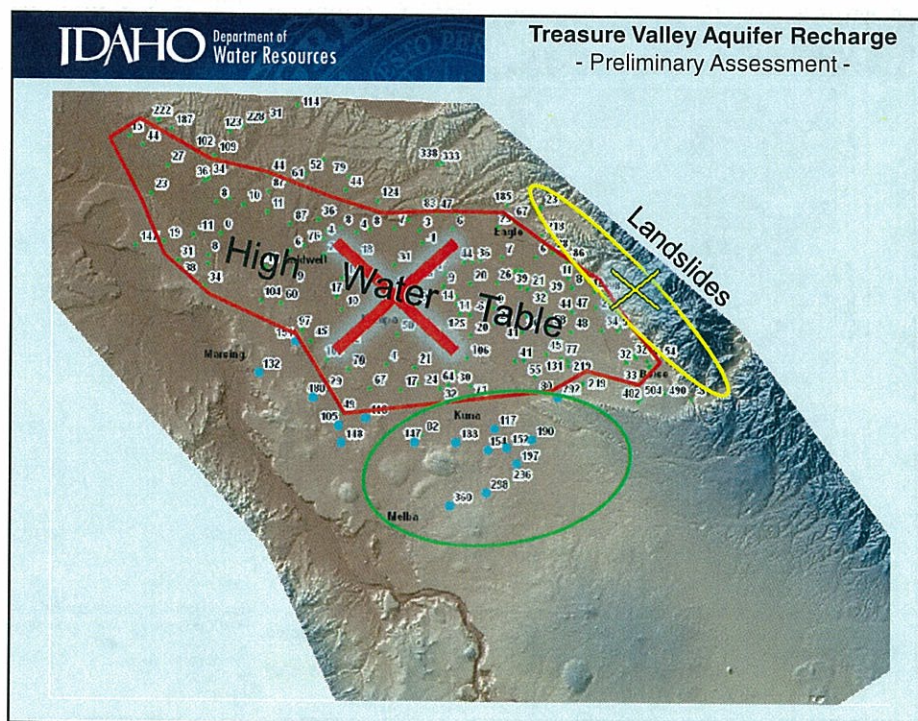
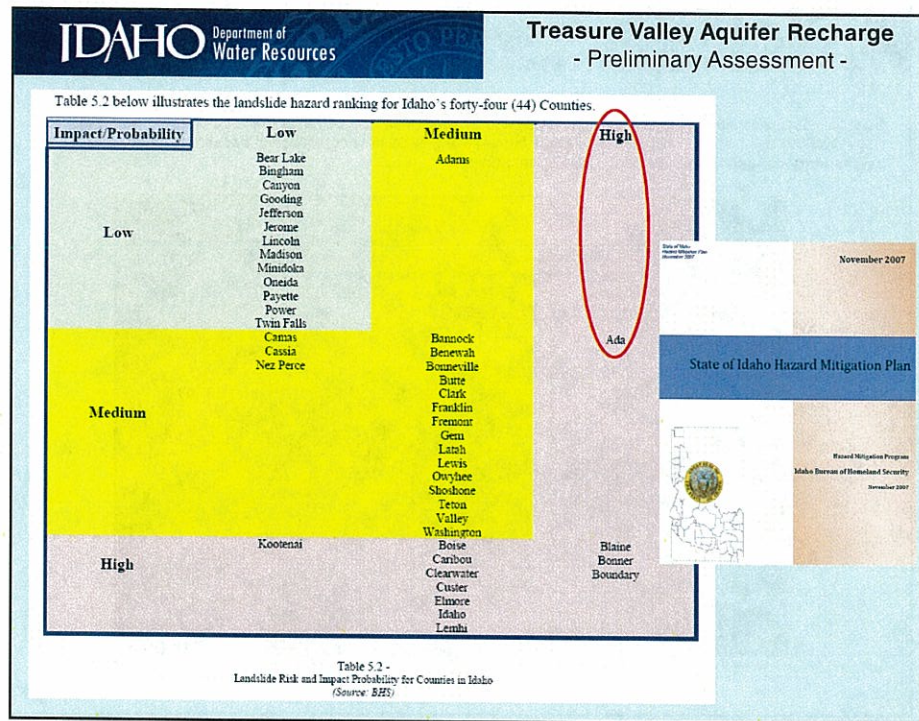


Figure 14. Sketch map of the Warm Springs landslide. The approximate location of the ancient landslide is shown by dashed black line.

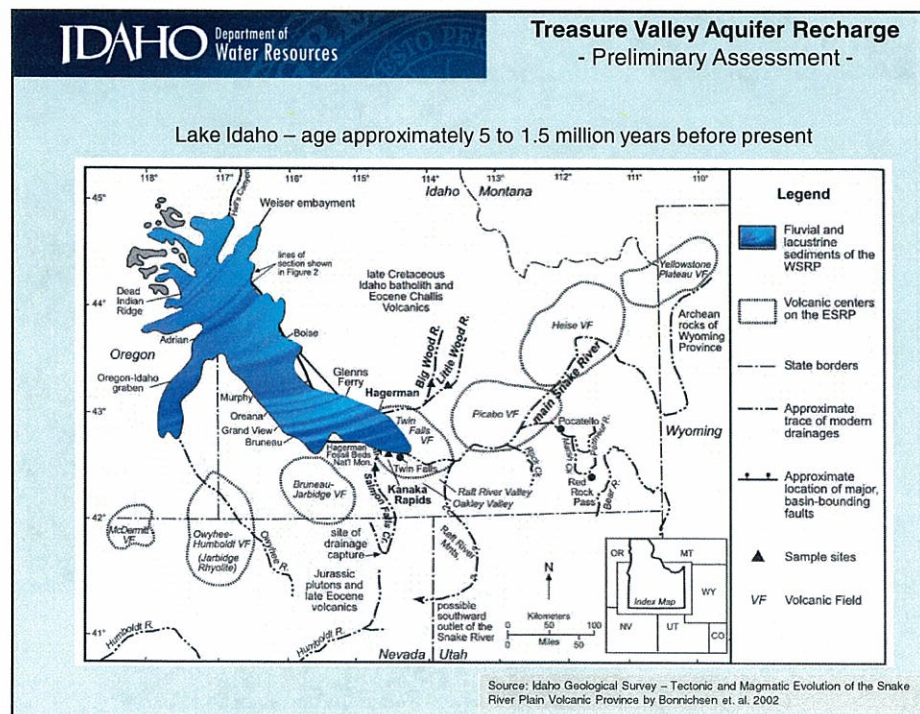
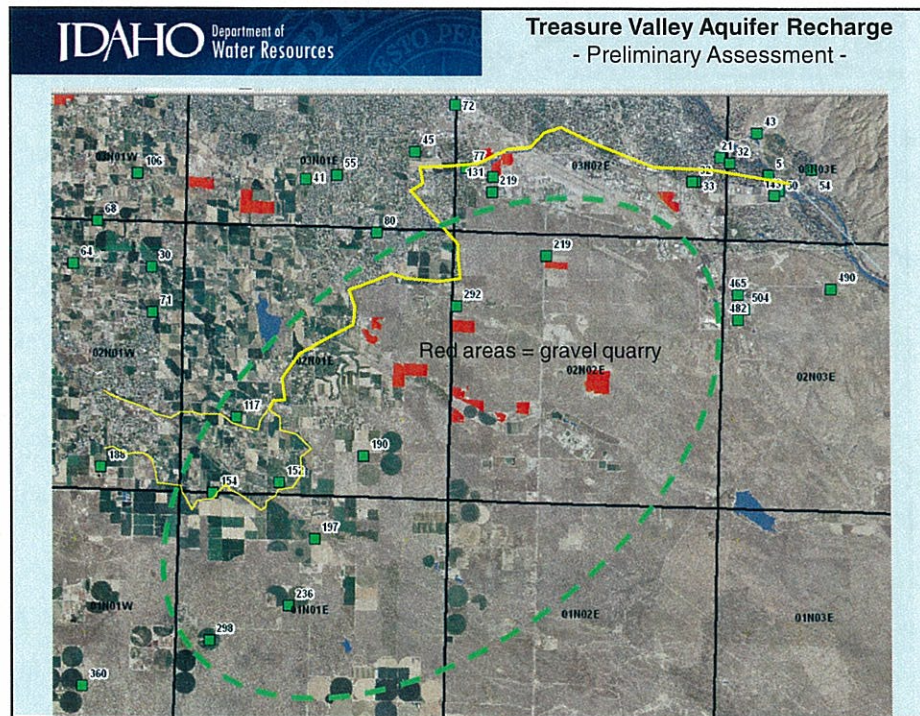
as large sandstone boulders scattered throughout the yards of many homes, and the hummocky nature of the landscape. Construction of Warm Springs Avenue along the toe of the landslide created an oversteepened slope that caused reactivation of a small portion of the slide. **Additional ground water derived from the new residential uses uphill of the slide may have also contributed to destabilizing the area.**

Source: Idaho Geological Survey  
Field Trip Guide to the Natural Hazards  
of the Boise Area, Idaho  
By William M. Phillips  
Staff Report 07-1  
January 2007

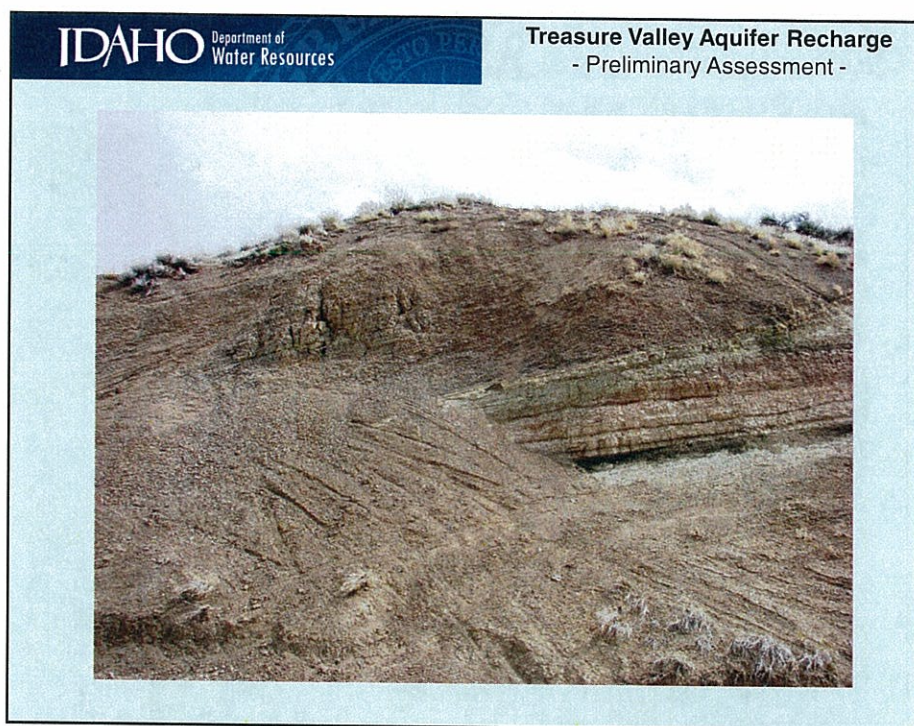












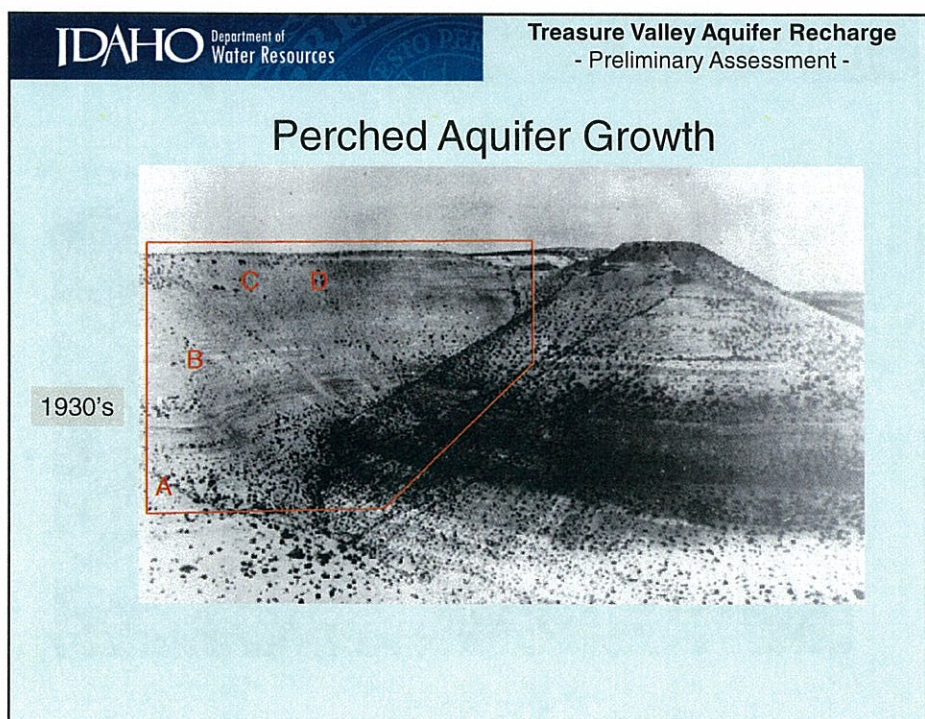
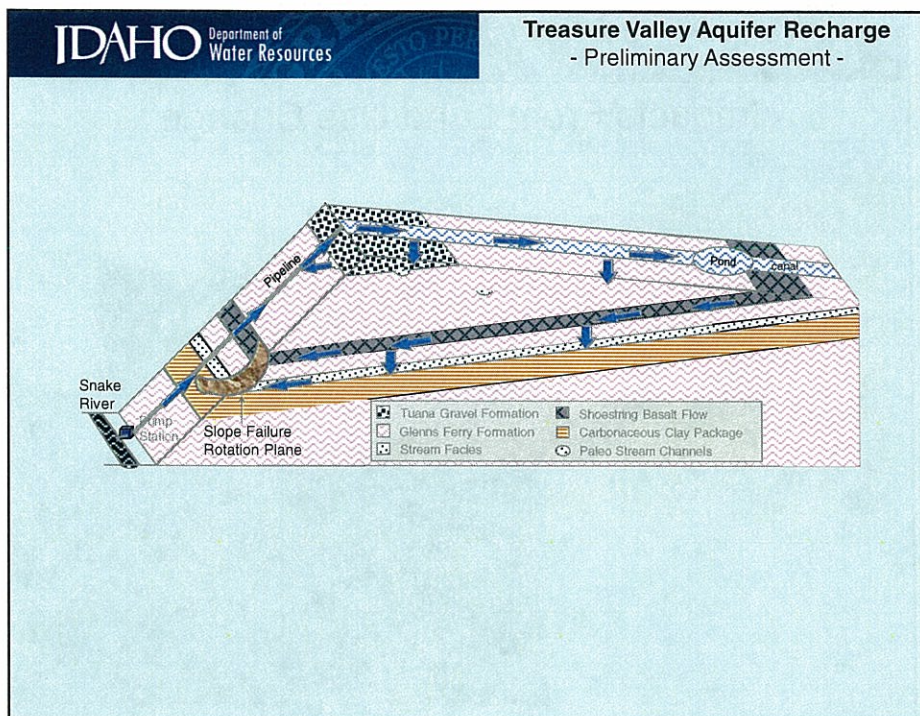
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- Preliminary Assessment -

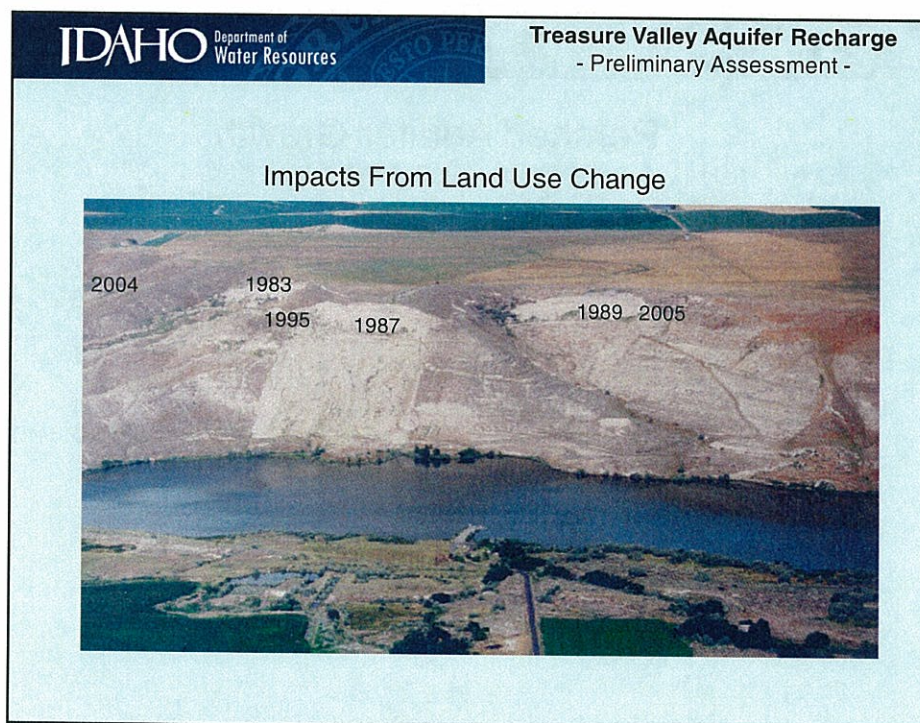
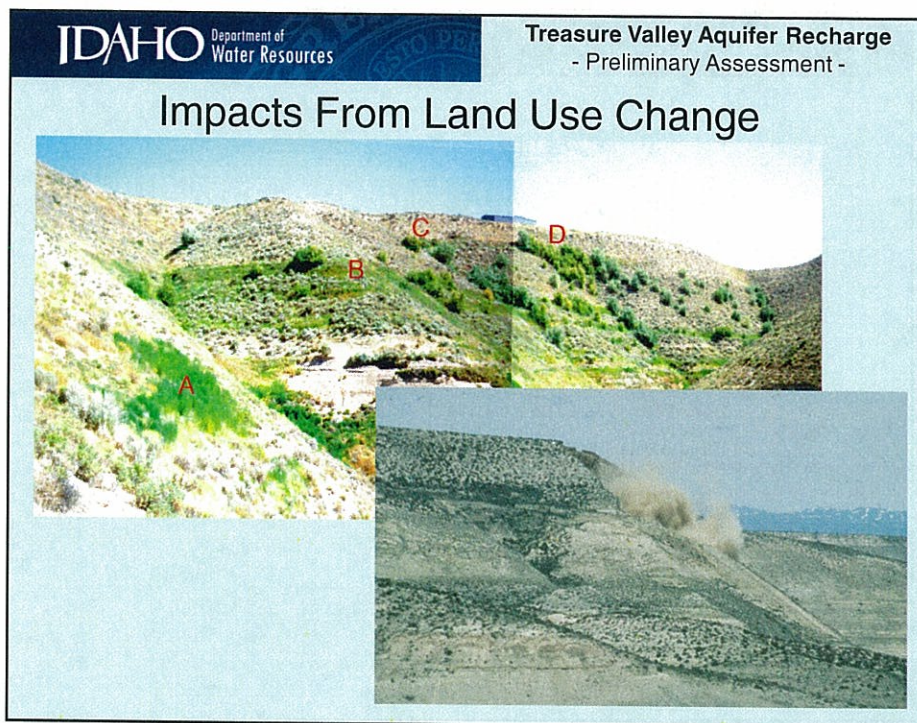
- Maximum delivery rate exceeded 120,000 g.p.m.
- Each pump = 9,000 g.p.m.
- Each electric motor = 10,000 h.p.
- 3 pipelines up hillside to plateau
- In July 2004 electric costs was ~ \$180,000

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## Landslide wipes out sites for utility's hydro project

By N.S. Nolkentved  
Times-News writer

TWIN FALLS — It's called Yahoo Clay, but it's no laughing matter.

The formation that is sliding into the Snake River below Bliss is a remnant of ancient lake deposits, named for the creek where it was first found.

But the Pleistocene clay deposit has wiped out the Shoshone Road, and it has wiped out two sites under consideration by Idaho Power Co. for a hydroelectric project, known as A.J. Wiley.

The slide also is threatening to wash out the bridge across the river below Bliss.

But Idaho Power is considering another potential hydroelectric site about two miles upstream from the slide, Idaho Power engineer Bob Sipe said.

The utility's early exploration of the area for the proposed hydroelectric project identified potential problems with the slide area.

In a 1980 letter to Idaho Power, Harold Mulde, a geologist with the U.S. Geological Survey, pointed out that a "massive landslide, reaching from river level to the canyon rim and occupying about half a square mile below Bliss, has been sporadically active for many years."

Saturating the "ice" of the landslide in a reservoir behind the proposed dam would clearly increase the risk of landsliding," Mulde wrote.

A 1982 environmental impact statement on the Idaho Power proposal suggested several possibilities for stabilizing the slide area:

- Diverting water courses away from the head of the slide.
- Intercepting springs within the slide.
- Leveling the slide to aid surface runoff.
- Drilling drains into water-bearing layer under the unstable clay.

The unstable layer of clay, identified by Mulde as Yahoo Clay, was named for the mouth of Yahoo Creek southwest of Hagerman where the deposit first was found.

The clay was deposited in a lake formed when a flow of molten McKinney Basalt dammed the ancient Snake River during the late Pleistocene Epoch more than 10,000 years ago.

The lake formed by the lava dam may have been as much as 600 feet deep. Clay deposits behind the dam were almost as deep.

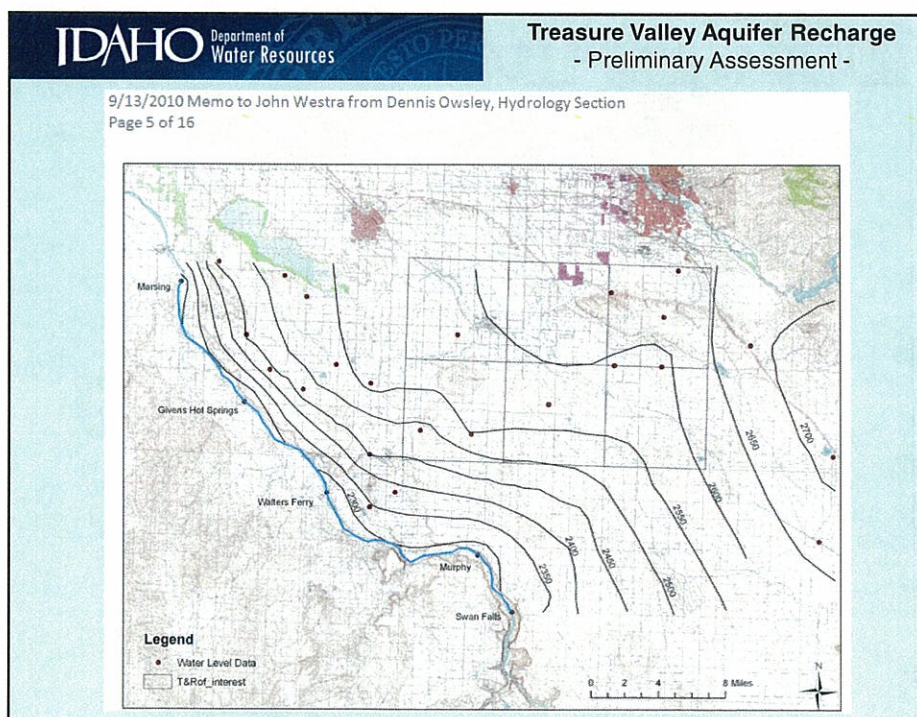
When it finally breached the lava dam, the river quickly cut down through the clay deposits and the puffy lava. Some remnants of the lake deposits were left high and dry above the new river channel, such as the deposit below Bliss and at the mouth of Yahoo Creek.

Besides pre-empting further consideration of potential sites below the slide, it has caused the utility no other serious problem, Sipe said. The clay from the slide is so fine it doesn't settle readily even in the slow-moving water of reservoirs behind the Bliss and C.J. Strike dams, Sipe said.

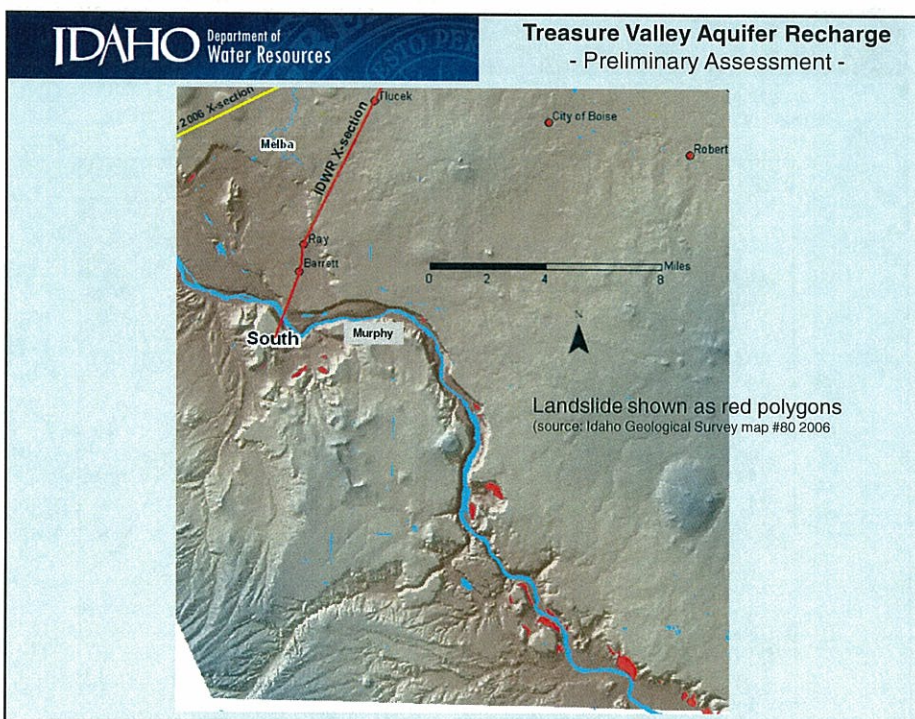
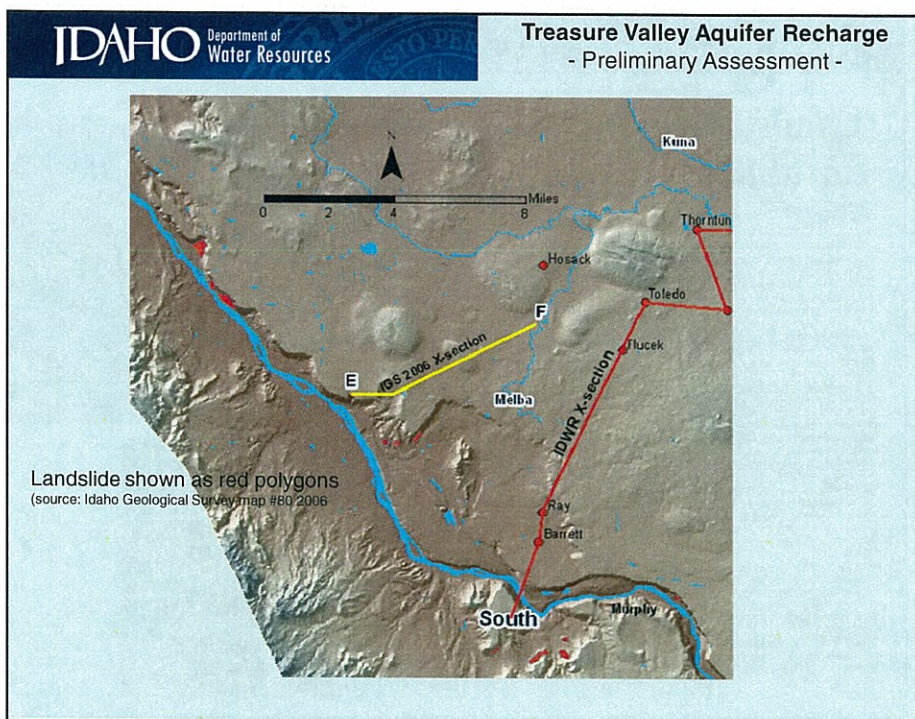
But a lot of debris — limbs, trees, fence posts — pushed into the river by the slide has piled up on the trash racks at the Bliss Dam, he said.

## Treasure Valley Aquifer Recharge - Preliminary Assessment -

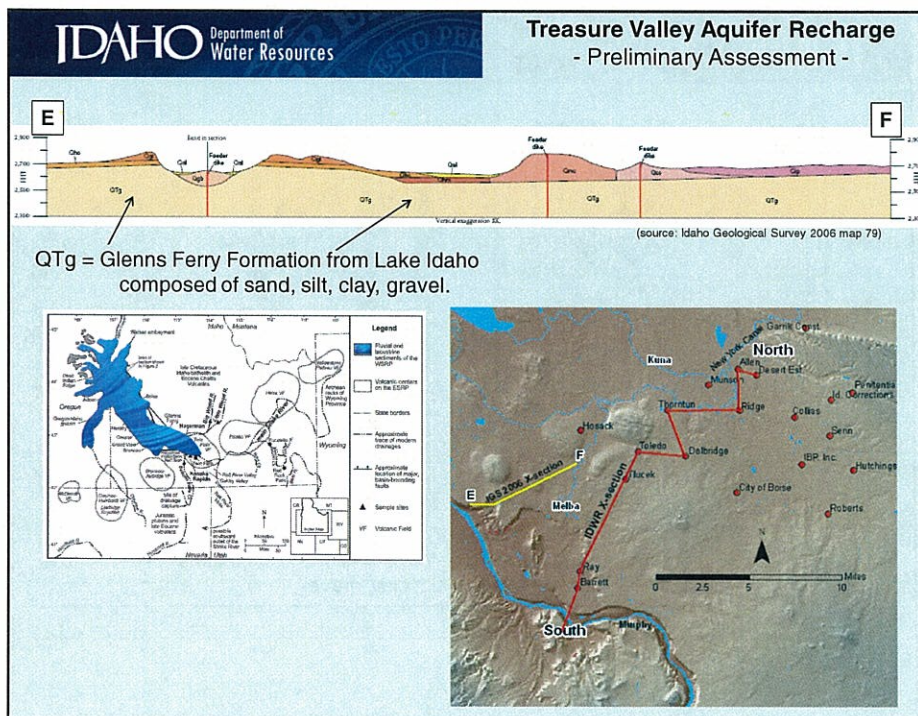
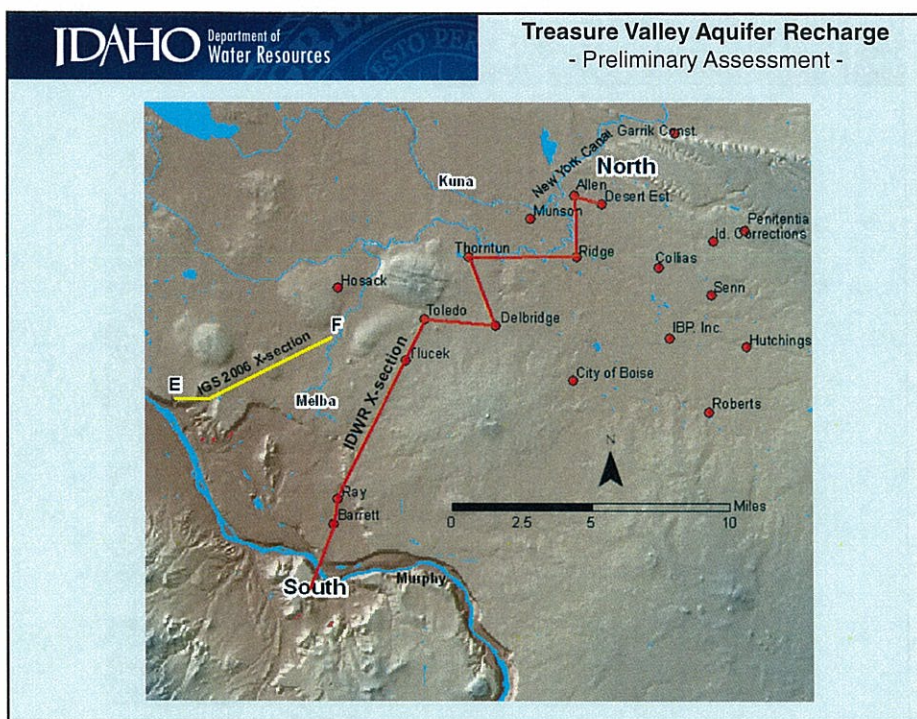


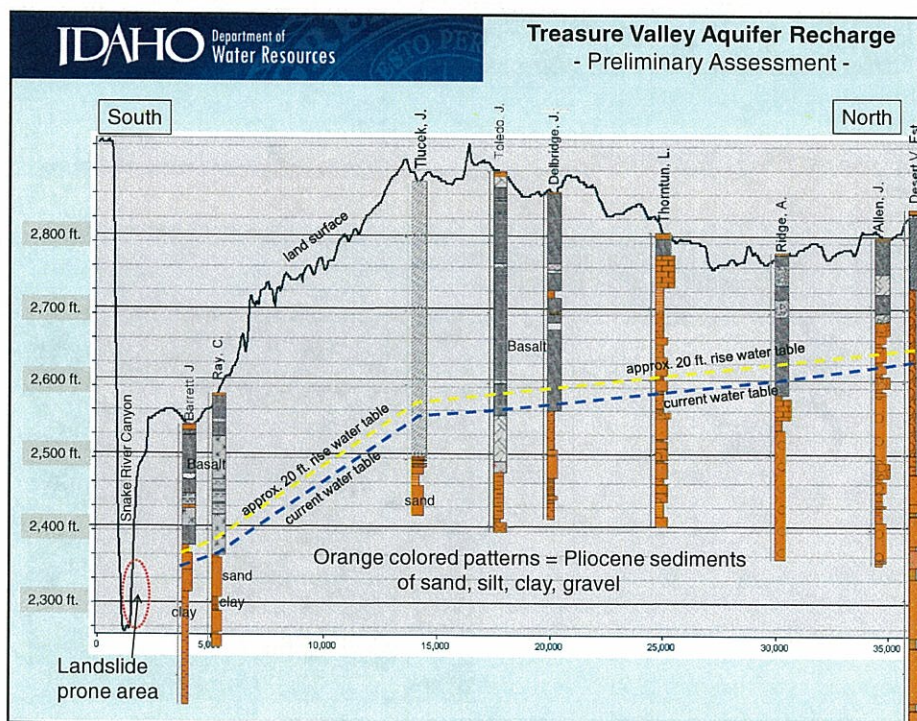
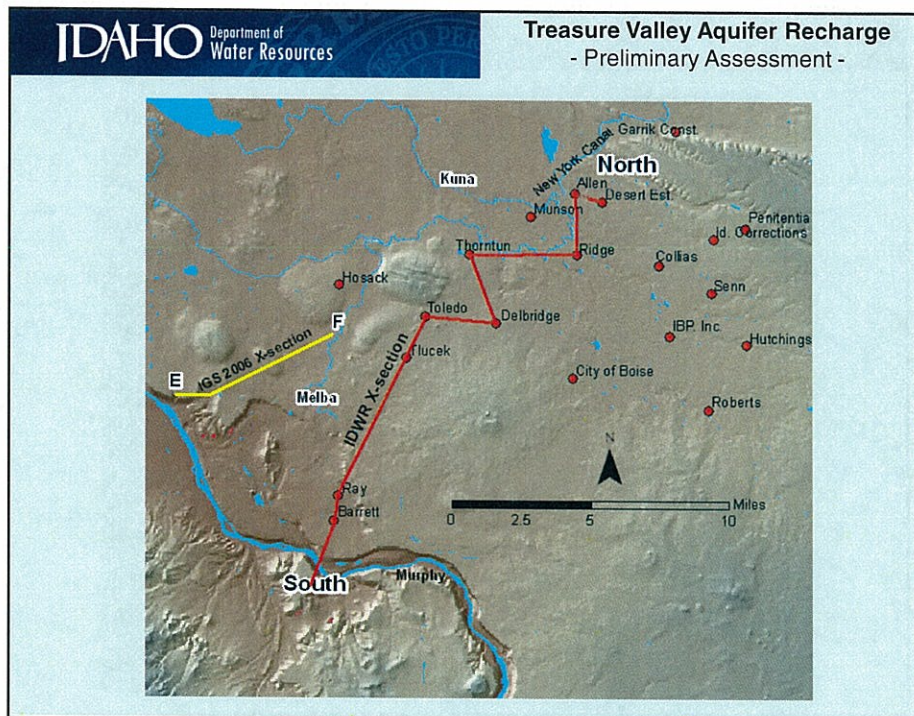




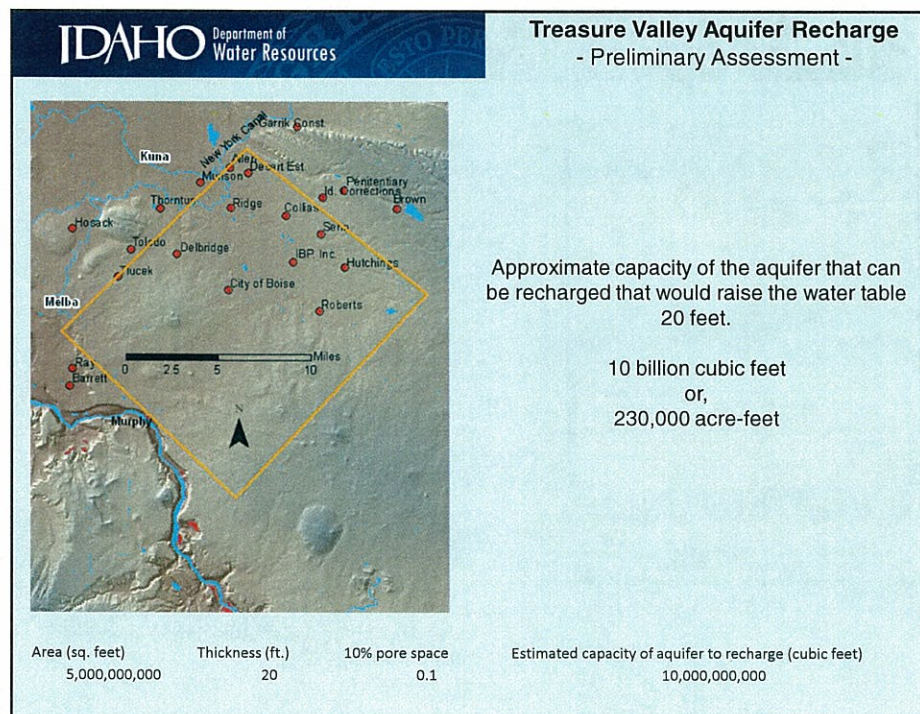
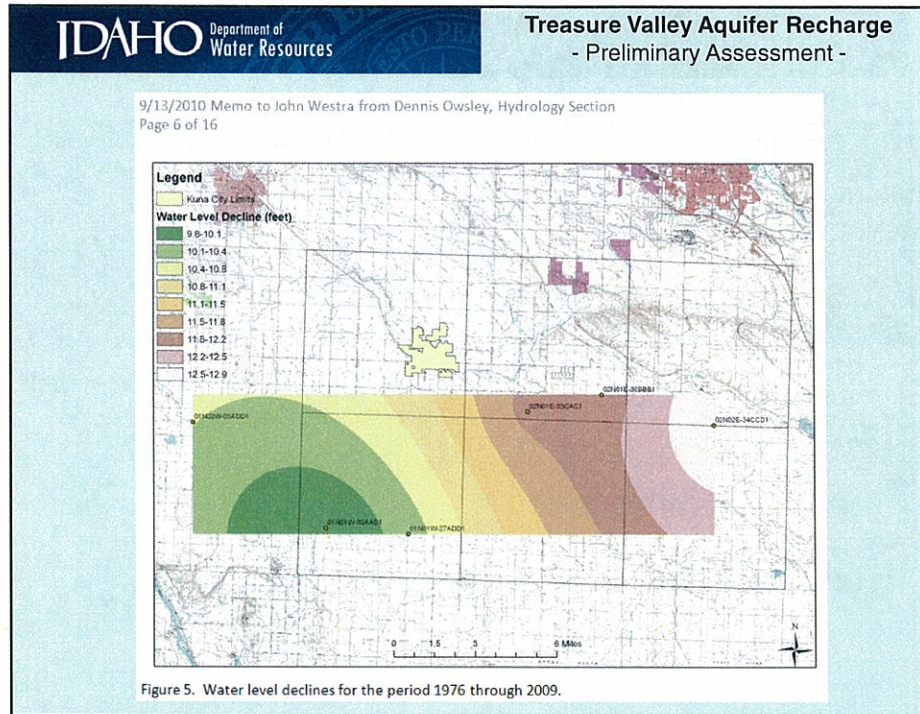




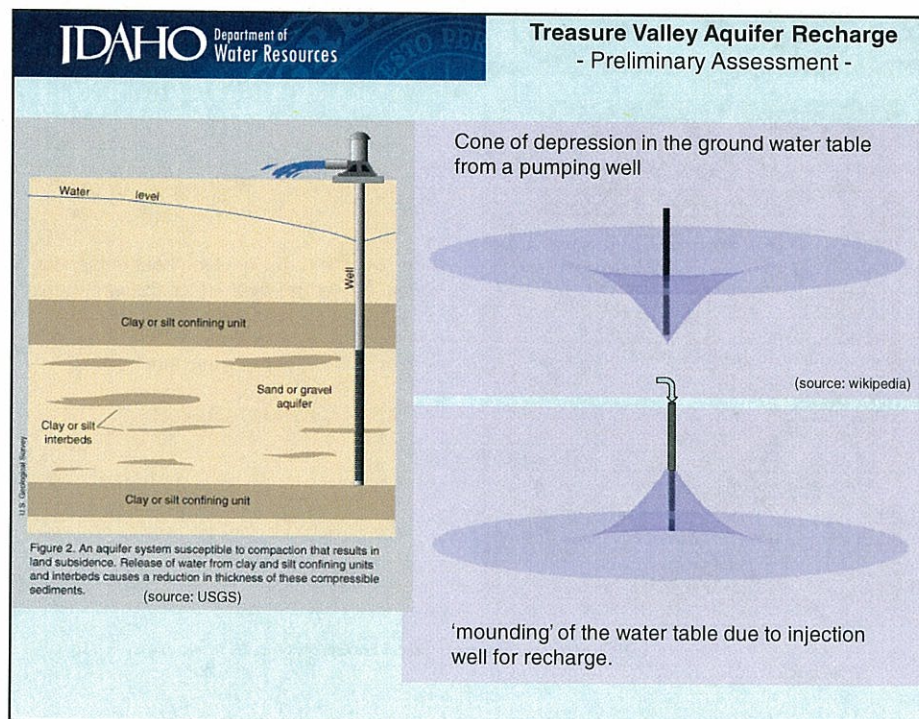
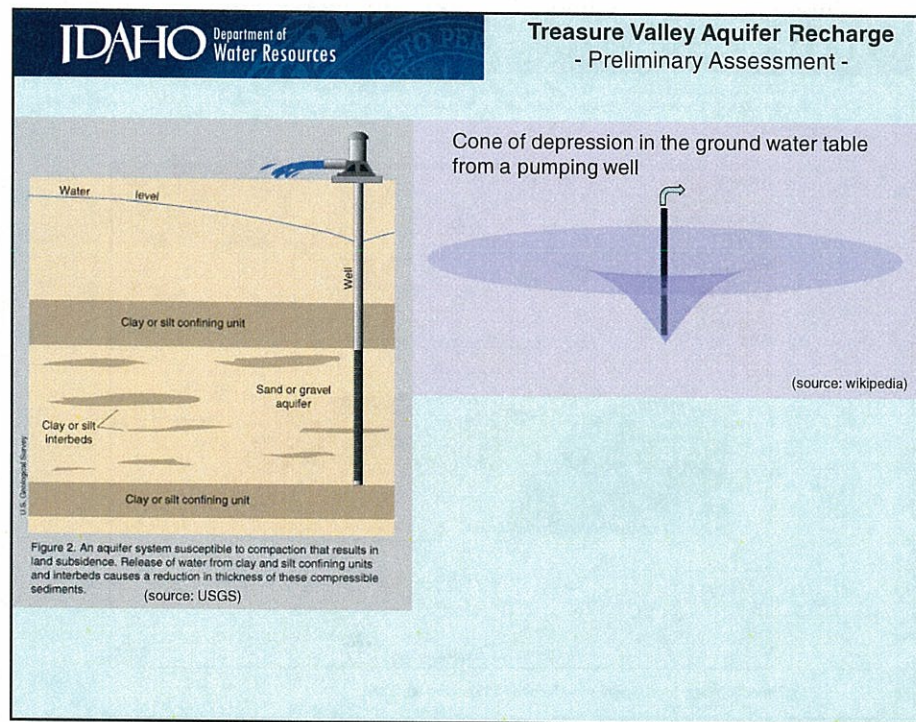




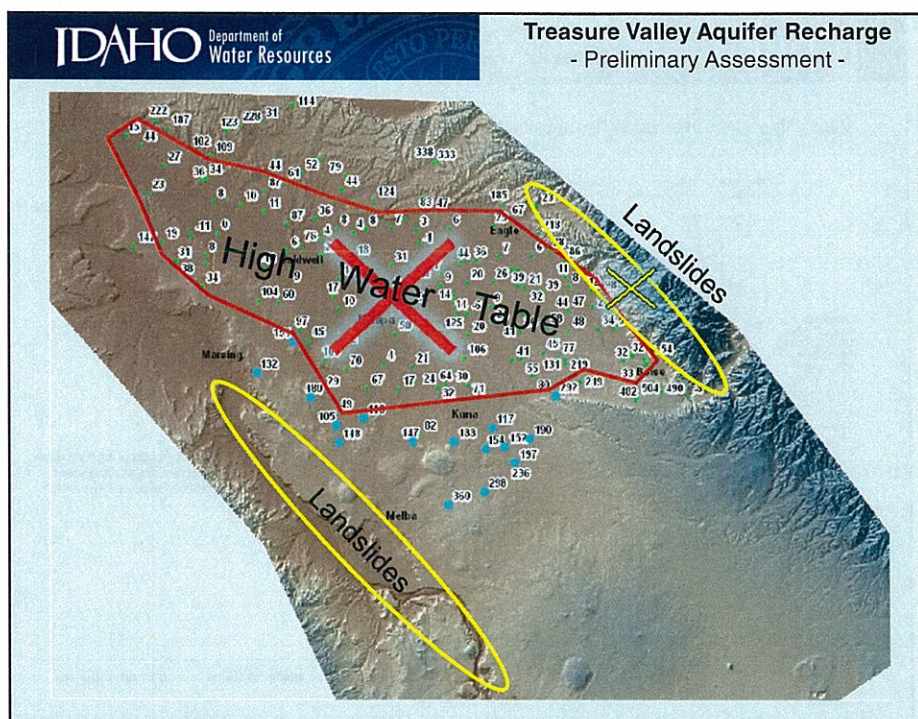




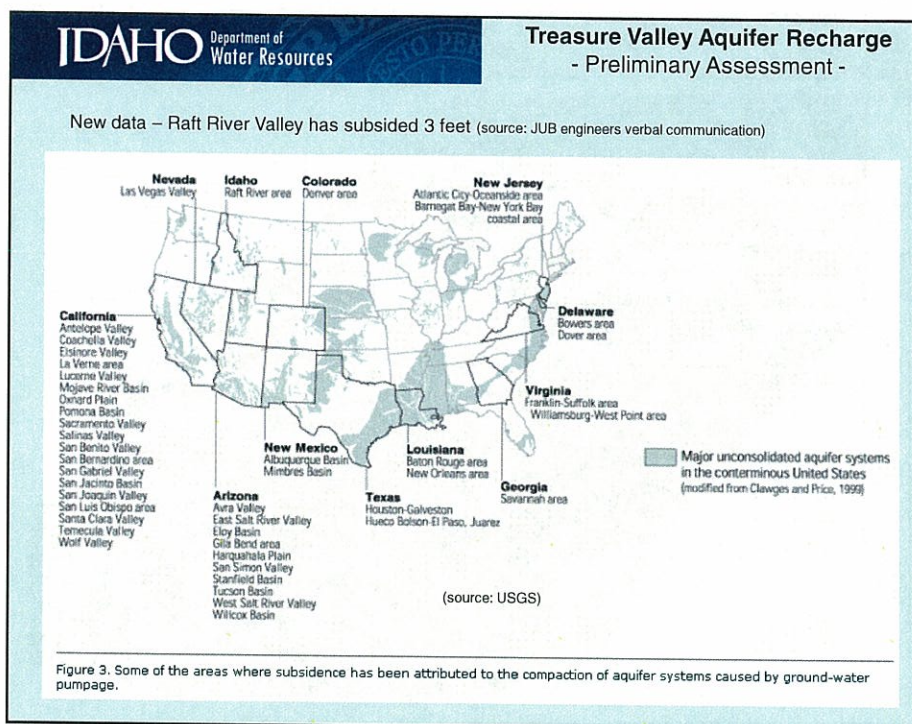












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**Treasure Valley Aquifer Recharge**  
- Preliminary Assessment -

Potential Issues with Recharge in Treasure Valley Area

1. Aquifer recharge in the west valley area may cause undesirable results such as flooded basements and foundation instability due to the current shallow depth to water (high water table).
2. Landslides along the Boise foothills is a serious issue for aquifer recharge in this area.
3. Land use change south of Boise that causes a rise in the regional water table higher than historic levels could cause additional slope instability in the Snake River Canyon.
4. Bell Rapids is an example of how land use change effected slope stability causing millions of dollars in damage and endangering human lives with essentially the same hydrogeology as the south Boise area.
5. Land use change in the area south of Boise that creates new perched aquifer systems (anthropogenic aquifers) that are located above the regional aquifer can induce or trigger new landslides and reactivate existing landslides along the Snake River Canyon as documented in the current Bell Rapids landslide issue.



Potential Benefits of Recharge in South Boise Area

1. Stabilize existing water level declines.
2. Recover water levels back up to pre-1976 levels (Owsley IDWR memo, 2010).
3. Proactive action implemented with anticipation of future groundwater demands.
4. Reduce possibility of land surface subsidence.
5. Helps address the Tragedy of Commons.

Points to Take Away

1. Conditions for recharge are better suited south of Boise due to the deeper water table.
2. The two most likely methods of recharge are seepage basins (perhaps in gravel pits) or injection wells. Each method has technical and permitting advantages and disadvantages.
3. Recharge that raises the regional water table to unnatural levels and/or creates new 'perched' aquifers above the regional aquifer may induce slope stability issues in the Snake River Canyon.
4. A rough estimate for the volume of water that could be recharged is 200,000 ac-ft.
5. Ground water level changes from recharge may be observed in a radial pattern from the location of recharge.



